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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,737	09/22/2003	Christian X. Campbell	2003P14126 US	1892

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Intellectual Property Department
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EXAMINER	
MILLER, DANIEL H	

ART UNIT	PAPER NUMBER
1775	

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/667,737	CAMPBELL, CHRISTIAN X.	
	Examiner	Art Unit	
	Daniel Miller	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/4/03+11/22/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Manning (U.S. 4,552,852).

Manning teaches a ceramic composition comprising a plurality of oxide shapes, a filler powder comprising zirconia-hafnia, and a binder material partially filling the gaps between the oxide shapes and the filler powder. In Manning, the plurality of oxide shapes are the alumina present within the ceramic. The zirconia-hafnia filler powder is the particulate ZrO2-HfO2 (column 5 Line 10). Manning also discloses a binding agent comprising glass bonding the alumina and zirconia-hafnia filler (column 1 line 65).

Claims 11 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Vance (U.S. 6,106,959).

Vance et al discloses an article comprising a YAG ceramic substrate, and an overlayer comprising zirconia-hafnia disposed on the ceramic substrate (column 3 line 15-45).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-4, 6 and 7 are rejected under 35 USC 103(a) as being obvious over Manning as applied to claim 1 above.

Although Manning is silent on the molar percentage of hafnia in the zirconia-hafnia filler powder and is also silent on the particle of the alumina, absent a showing of criticality with respect to the molar percentage and particle size (result effective variables), it would have been obvious to a person of ordinary skill in the art at the time of the invention to optimize the molar percentage and particle size through routine experimentation. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manning as applied to claim 1 above, and further in view of Merrill (U.S. 6,287,511).

Manning further teaches a filler powder comprising zirconia-hafnia also including alumina. It additionally discloses a glass binder containing alumina and teaches that zirconia-hafnia has a greater maximum stable temperature (column3, 60-65 and column 5, lines 30-40) Manning fails to teach the use of mullite spheres.

Merrill teaches hollow mullite spheres disposed between stabilized zirconia and further teaches that the mullite spheres improve dimensional stability (column 7 line 10-20).

Therefore, it would be obvious to a person of ordinary skill in the art at the time of the invention to combine the zirconia-hafnia layer of the coating in Manning with the mullite spheres of Merrill because zirconia-hafnia has a greater maximum stable temperature and the mullite sphere would further improve dimensional stability.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over manning as applied to claim Manning above, and further in view of Lee (U.S. 6,733,908).

Manning recites all the limitations of claim 1 but fails to teach a mullite substrate.

Lee shows stabilized zirconia on a (oxide-oxide ceramic matrix) mullite substrate for increased cracking resistance (column 7 line 10-20 and Figure 1).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to combine a zirconia-hafnia layer over a mullite substrate because it would increase cracking resistance.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manning and Lee as applied to claim 9 above.

Although Manning is silent on the thickness of the zirconia-hafnia layer, absent a showing of criticality with respect to the molar percentage and particle size (result effective variables), it would have been obvious to a person of ordinary skill in the art at the time of the invention to optimize the molar percentage and particle size through routine experimentation. It has been held that discovering an optimum value of a result

effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vance et al. in view of Lee et al.

Vance teaches all the limitations of claim 11 as above but is silent as to the layer being placed on a (oxygen barrier layer) mullite layer or a non-oxide substrate.

Lee teaches a stabilized zirconia layer followed by a (oxygen barrier layer) mullite-containing layer. The mullite layer is an oxygen barrier layer interposed between the substrate. Lee also teaches a non-oxide substrate (column 8 line 20). The layers of Lee increase stability at high temperature (column 3 line 15-25).

It would have been obvious to a person of ordinary skill at the time of the invention to combine the coating of Vance with the layers of Lee to increase stability at high temperatures.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vance in view Manning.

Vance teaches all the elements of claim 11 as above but is silent as to a zirconia-hafnia ceramic containing alumina.

Manning teaches a zirconia-hafnia ceramic containing alumina (column 3 line 40-50). Manning further teaches that alumina zirconia composites have increased thermal shock capacity (column 1 line 25-30).

It would have been obvious to a person of ordinary skill at the time of the invention to modify Vance with the ceramic of Manning because it would increase thermal shock capacity.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. in view of Vance et al.

Lee teaches a stabilized zirconia layer followed by a mullite-containing layer. The mullite layer is an insulating mullite layer interposed between the coating and ceramic matrix substrate as in figure 1. Lee does not teach a zirconia –hafnia layer.

Vance teaches a zirconia-hafnia overlay of figure 1. This layer is chosen because of its improved stability at higher temperatures (column 3 line 15-25).

It would have been obvious to a person of ordinary skill at the time of the invention to combine the coating of Vance with the layers of Lee to increase stability at higher temperatures.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Vance as applied to claim 19 above, and further in view of Manning.

Vance in view of Lee teaches all the elements o claim 19 as above, but are silent on the zirconia-hafnia layer also comprising alumina.

Manning teaches a ceramic having a zirconia-hafnia and alumina composition. The zirconia-hafnia composition of Manning remains stable at higher temperatures then traditional stabilized zirconia (column 3 line 60-65).

It would have been obvious to a person of ordinary skill at the time of the invention to combine the overlay of Vance in view of Lee as in claim 19 with the ziconia-hafnia, and alumina ceramic composition of Manning, because it would create higher stability.

Conclusion

Cited but not relied upon is Morrison (U.S. 6,197,424 B1), which also teaches a ceramic containing hollow mullite spheres, a filler powder, and binder filling between gaps in oxide shapes (Column 5, 11 line 50-65, and claim 1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Miller whose telephone number is (571)272-1534. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571)272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Daniel Miller

April 15, 2005

DEBORAH JONES
SUPERVISORY PATENT EXAMINER